

**REMARKS**

The Final Office Action dated April 22, 2004, has been received and reviewed.

Claims 1-14 and 16-24 are currently pending and under consideration in the above-referenced application, each standing rejected.

Claim 15 was canceled without prejudice or disclaimer in the Amendment of January 12, 2004. Therefore, all of the rejections of claim 15 are moot.

Reconsideration of the above-referenced application is respectfully requested.

**Information Disclosure Statements**

Please note that Information Disclosure Statements were filed in the above-referenced application on August 30, 2001, and November 15, 2002, but that the undersigned attorney has not yet received any indication that the references cited in these Information Disclosure Statements have been considered in the above-referenced application. It is respectfully requested that the references cited in the Information Disclosure Statements of August 30, 2001, and November 15, 2002, be considered and made of record in the above-referenced application and that an initialed copy of the Forms PTO-1449 that accompanied the Information Disclosure Statements be returned to the undersigned attorney as evidence of such consideration.

**Double Patenting Rejection Under 35 U.S.C. § 101**

Claims 5, 7-12, 14, 16, and 18-24 stand rejected under 35 U.S.C. § 101 for purportedly reciting the same invention as that recited in claims 5-12 of U.S. Patent 6,322,634 (hereinafter “the ‘634 Patent”).

35 U.S.C. § 101 provides in relevant part: “Whoever invents or discovers any new and useful process . . . may obtain *a* patent therefor . . . ” (emphasis added). In explaining the basis on which a double patenting rejection under 35 U.S.C. § 101 should be premised, M.P.E.P. § 804(II)(A) provides:

In determining whether a statutory basis for a double patenting rejection exists, the question to be asked is: Is the same invention being claimed twice?

. . . Is there an embodiment of the invention that falls within the scope of one claim, but not the other? If there is such an embodiment, then identical subject matter is not defined by both claims and statutory double patenting would not exist.

Claim 5 of the '634 Patent recites a buffer film layer that comprises "a substantially oxidation resistant materials [sic]."

While claim 5 of the above-referenced application recites a precursor to a semiconductor device structure with many of the same elements of the intermediate semiconductor device structure of claim 5 of the '634 Patent, claim 5 of the above-referenced application does not require a buffer film layer to comprise "a substantially oxidation resistant materials [sic]."

Therefore, it is respectfully submitted that claim 5 of the above-referenced application does not recite identical subject matter to that recited in claim 5 of the '634 Patent. Accordingly, under 35 U.S.C. § 101, claim 5 of the above-referenced application is allowable over claim 5 of the '634 Patent.

Independent claim 7 of the above-referenced application likewise appears to have been rejected for reciting the same subject matter as that to which claim 5 of the '634 Patent is drawn. Like claim 5 of the above-referenced application, however, independent claim 7 lacks the requirement that the buffer film layer thereof comprise "a substantially oxidation resistant materials [sic]."

As independent claim 7 lacks a limitation that is present in claim 5 of the '634 Patent, independent claim 7 does not recite subject matter which is identical to that recited in claim 5 of the '634 Patent and, thus, is, under 35 U.S.C. § 101, allowable over claim 5 of the '634 Patent.

Claims 8-12 are each allowable, among other reasons, for depending either directly or indirectly from claim 7, which is allowable.

Claims 14 and 16 of the above-referenced application have apparently been rejected for reciting the same subject matter as that recited in claims 8 and 9, respectively, of the '634 Patent.

Independent claim 8 of the '634 Patent and, thus, claim 9, which depends from claim 8, are limited to a structure which includes a trench that is "formed in an active surface" of a semiconductor substrate.

Claims 14 and 16 differ in scope from claims 8 and 9, however, because claims 14 and 15 lack the requirement that a trench be "formed in *an active surface*" (emphasis supplied) of a semiconductor substrate, instead reciting (in claim 13, from which claims 14 and 16 both depend) that the trench is merely formed in *the semiconductor substrate*.

In view of this difference, it is respectfully submitted that claims 14 and 16 of the above-referenced application differ in scope from claims 8 and 9, respectively, of the '634 Patent and, thus, that, under 35 U.S.C. § 101, claims 14 and 16 are allowable over claims 8 and 9, respectively, of the '634 Patent.

Independent claim 18 of the above-referenced application has apparently been rejected for reciting the same subject matter as that recited in claim 5 of the '634 Patent.

Like claim 5 of the above-referenced application, however, independent claim 18 lacks the requirement of claim 5 of the '634 Patent of a buffer film layer that comprises "a substantially oxidation resistant materials [sic]."

Therefore, it is respectfully submitted that independent claim 18 does not recite identical subject matter to that recited in claim 5 of the '634 Patent. Accordingly, under 35 U.S.C. § 101, independent claim 18 of the above-referenced application is allowable over claim 5 of the '634 Patent.

Each of claims 19-24 is allowable, among other reasons, for depending either directly or indirectly from claim 18, which is allowable.

For these reasons, it is respectfully requested that the 35 U.S.C. § 101 double patenting rejections of claims 5, 7-12, 14, 16, and 18-24 be withdrawn.

**Obviousness-Type Double Patenting Rejections**

Claims 1-4, 6, and 17 stand rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 5-12 of U.S. Patent 6,322,634.

A terminal disclaimer and the appropriate fee were filed in the above-referenced application on January 12, 2004. Copies of the Terminal Disclaimer, Transmittal Form, check in the amount of \$110.00, and USPTO date-stamped postcard evidencing receipt of the same by the Office on January 12, 2004, are enclosed.

The filing of a terminal disclaimer in the above-referenced application should not be construed as acquiescence of the obviousness-type double patenting rejection.

**Provisional Claim Objection Under 37 C.F.R. § 1.75**

Claim 20 has been provisionally objected to under 37 C.F.R. § 1.75 for being a substantial duplicate of independent claim 7.

It is respectfully submitted that claim 20 is not a substantial duplicate of independent claim 7. For example, claim 20 depends from claim 18, which recites that the shallow trench isolation structure thereof “contact[s] an area of [an] active surface” of a semiconductor substrate, while independent claim 7 includes no such requirement.

Accordingly, withdrawal of the provisional objection to claim 20 is respectfully requested.

**Rejections Under 35 U.S.C. § 102(b)**

Claims 1-4, 6, 12, and 17 stand rejected under 35 U.S.C. § 102(b).

Mandelman

Claims 1-4, 6, 12, and 17 stand rejected under 35 U.S.C. § 102(b) for reciting subject matter which is purportedly anticipated by that described in U.S. Patent 5,521,422 to Mandelman et al. (hereinafter “Mandelman”).

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single reference which qualifies as prior art under 35 U.S.C. § 102. *Verdegaal Brothers v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

Mandelman describes (at col. 5, lines 3-23) and illustrates (in FIG. 4c) a precursor to a semiconductor device structure that includes a semiconductor substrate 10 with trenches formed therein. The trenches and areas of the active surface of the semiconductor substrate 10 that are adjacent to the trenches are lined with a thermal oxide 34. Shallow trench isolation (STI) structures 18a fill the remaining space within the trenches, and extend over the areas of the active surface of the semiconductor substrate that are located adjacent to the trenches.

Mandelman does not provide any details as to how STI structures 18a may be formed. In particular, Mandelman lacks any express or inherent description that the STI structures 18a or the layer from which they are formed is somehow annealed to or otherwise rendered indiscernible from the underlying thermal oxide 34.

The precursor to which independent claim 1 is drawn includes many of the elements described in Mandelman, but lacks an intervening thermal oxide between the STI structures and the surfaces of the trenches and active surface of the semiconductor substrate. Instead, independent claim 1 recites “at least one shallow trench isolation structure” that contacts “an active surface of [a] semiconductor substrate adjacent . . . at least one trench.”

Mandelman does not expressly describe that the STI structures 18a thereof may contact an active surface of a semiconductor substrate. Mandelman also lacks any description that the STI structures 18a thereof are rendered indiscernible from the underlying thermal oxide 34.

Thus, Mandelman does not inherently describe that the STI structures 18a thereof contact an active surface of a semiconductor substrate.

Therefore, Mandelman does not anticipate each and every element of independent claim 1, as is required to maintain a rejection under 35 U.S.C. § 102(b). Therefore, under 35 U.S.C. § 102(b), independent claim 1 recites subject matter which is allowable over that described in Mandelman.

Each of claims 2-4 and 6 is allowable, among other reasons, for depending either directly or indirectly from claim 1, which is allowable.

Claim 12, which depends from independent claim 7, is allowable for depending from claim 7, which is directed to subject matter which has not been rejected as having been anticipated by the disclosure of Mandelman and which is, therefore, presumed to be allowable over Mandelman.

Claim 17 is allowable, among other reasons, for depending from claim 13, which has not been rejected for reciting subject matter which is purportedly anticipated by Mandelman and, therefore, is presumed to be allowable over Mandelman.

Morita et al.

Claims 1, 2, 4, 6, 7, 13, and 17 stand rejected under 35 U.S.C. § 102(b) for reciting subject matter which is assertedly anticipated by the disclosure of U.S. Patent 5,506,168 to Morita et al. (hereinafter "Morita").

FIG. 72 of Morita shows an intermediate semiconductor device structure that includes a semiconductor substrate 1 with at least one trench 2 formed therein, silicon oxide films 11 and 36 lining the active surface of the semiconductor substrate 1 and the surfaces of the trench 2, respectively, and a silicon nitrogen film 37 filling the at least one trench. *See also*, col. 13, lines 19-26.

Morita lacks any express description that the silicon oxide film 1 that lines the active surface of the semiconductor substrate 1 may be annealed to or otherwise rendered indiscernible from the silicon nitrogen film 37. Since it would not be necessary to anneal the silicon oxide

film 1 and the silicon nitrogen film 37 to one another, or to otherwise render these films indiscernible from one another, Morita also lacks any inherent description that these two films are indiscernible from each other.

Again, independent claim 1 of the above-referenced application recites a precursor to a semiconductor device structure. The precursor includes, among other things, a semiconductor substrate with at least one trench formed therein and at least one shallow trench isolation structure. A portion of the at least one shallow trench isolation structure extends laterally over and contacts an area of an active surface of the semiconductor substrate located adjacent to the at least one trench.

In contrast, Morita does not expressly describe that the silicon nitrogen film 37 thereof contacts an active surface of the underlying semiconductor substrate 1. Instead, a silicon oxide film 36 is located between the silicon nitrogen film 37 and the active surface of the substrate 1.

Moreover, Morita lacks any express description that the silicon oxide film 1 that lines the active surface of the semiconductor substrate 1 may be annealed to or otherwise rendered indiscernible from the silicon nitrogen film 37. Since it would not be necessary to anneal the silicon oxide film 1 and the silicon nitrogen film 37 to one another, or to otherwise render these films indiscernible from one another, Morita also lacks any inherent description that these two films are indiscernible from each other. Therefore, Morita also includes no inherent description that the silicon nitrogen film 37 thereof contacts an active surface of the underlying semiconductor substrate 1.

For these reasons, Morita does not anticipate each and every element of independent claim 1. Accordingly, under 35 U.S.C. § 102(b), independent claim 1 is drawn to subject matter which is allowable over that disclosed in Morita.

Claims 2, 4 and 6 are each allowable, among other reasons, for depending either directly or indirectly from claim 1, which is allowable.

Independent claim 7 is directed to an intermediate semiconductor device structure that includes, among other things, at least one densified trench isolation structure. Morita neither

expressly nor inherently describes that the silicon nitrogen film 37 described therein may be densified. Therefore, Morita does not anticipate each and every element of independent claim 7.

Independent claim 13 also recites subject matter which is allowable over that described in Morita because Morita includes no express or inherent description that the silicon nitrogen layer 37 thereof contacts the active surface of the semiconductor substrate 1 thereof.

Claim 17 is allowable, among other reasons, for depending from claim 13, which is allowable.

In view of the foregoing, it is respectfully requested that the 35 U.S.C. § 102(b) rejections of claims 1, 2, 4, 6, 7, 12, 13, and 17 be withdrawn.

#### **ENTRY OF AMENDMENT**

Entry of the proposed amendment to the title of the above-referenced application is respectfully requested. It is respectfully submitted that the proposed amendment to the title better reflects the subject matter to which the claims of the above-referenced application are directed; the proposed amendment does not introduce new matter into the above-referenced application and would not require an additional search.

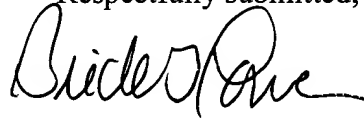
If, for some reason, the proposed amendment to the title is not entered, it is respectfully requested that the proposed amendment be entered when a Notice of Appeal is filed in the above-referenced application.



**CONCLUSION**

It is respectfully submitted that each of claims 1-14 and 16-24 is allowable. An early notice of the allowability of each of these claims is respectfully solicited, as is an indication that the above-referenced application has been passed for issuance. If any issues preventing allowance of the above-referenced application remain which might be resolved by way of a telephone conference, the Office is kindly invited to contact the undersigned attorney.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Brick G. Power". The signature is fluid and cursive, with the first name "Brick" being more prominent.

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